Response to comments received by e-mail on Conceptual Site Model (CSM) diagrams from Katrina Coltrain, Barry Forsythe, and Philip Turner.

One general point of clarification regarding multiple comments received on the nature of the water ponding on top of the sandstone/clay layer that underlies the site. This water was called at one point perched ground water; however, this water is temporary in nature. The high soil permeability causes this transient saturated condition on top of the layer of much lower permeability. As such, this transient water has not beneficial uses as no wells are likely to be installed for extraction of the water. In evaluating it, standards such as the federal maximum contaminant level and EPA regional screening levels for tap water would not apply. For this reason, we have not included this water as an exposure medium in the CSM, rather it acts as transport mechanism for the contamination through soil. When this infiltrated water daylights, it becomes surface water, although only at times when actual flow is present at seep locations following precipitation events, it may manifest itself as an exposure medium (surface water) that can have risk associated with it. When the seepage rate is low, the sandstone may get wet and as such, it does not constitute a medium that in itself, can pose a threat to human health and the environment.

Comments received From: Forsythe, Barry [mailto:barry_forsythe@fws.gov]
Sent: Thursday, February 18, 2016 7:37 AM
To: Coltrain, Katrina
Cc: McMillan, Teresa; Radu, Cristina; Todd Downham; Turner, Philip
Subject: Re: CSM--ECO and HH

Looking at your comments/questions, I would say I agree with them at this point in the process. 1) For the fish, they would be covered by surface water screening levels. **Response – in the CSM, they are included under Aquatic and Benthic Organisms; we plan on comparing the surface water concentrations to acute and chronic National Recommended Water Quality Criteria for freshwater aquatic life.** 2) While the inhalation pathway is complete, the literature to assess risk is scant and would mean a quantitative assessment would have high uncertainty. **Response: Noted – no change will be made to the CSM.** 3) For Sand Creek, I'm guessing the exposure of plants to sediment is minimal and would be accounted for by more conservative evaluations of invertebrate risks. **Response: Noted – no change will be made to the CSM.** 4&5) I believe the figure says the aquatic-dependent wildlife exposure to ingestion of prey is complete, but insignificant. I would say, that without a full understanding of the COPCs, it's premature to say that. Some of the COPCs may be bioaccumulative. **Response: The CSM was changed to show that the pathway from aquatic food chain for birds and mammals is complete and significant**

My additional comment would be that the groundwater to surface water pathway needs to be added, since seeps into Sand Creek have been noted and the groundwater is shallow and perched (assumed). – **Response: Please see above explanation of the infiltrated water as not constituting an exposure medium. The potential for interaction between surface water and the ground water in the regional aquifer is already shown in the Human Health CSM by a 2-sided arrow connecting ground water and surface water under exposure media (on the right side of the diagram; a box identifying loss/gain as**

the interaction mechanism is placed on this arrow). The DQOs for the surface water/sediment media identify this interaction as one of the elements of the investigation.

Barry

Comments Received on Thu, Feb 18, 2016 at 8:04 AM, Coltrain, Katrina <coltrain.katrina@epa.gov> wrote:

Good Morning, please see below some of my thoughts on the CSMs

HH

1. Do we need to identify the following as separate sources: LNAPL (if it exists), the sludge in the pit and Tank 10 area, and the additives area (high lead area)? – **Response: The interaction between ground water and LNAPL has been added to the HH CSM; the interaction between the LNAPL and ground water would be through adsorbtion and dissolution. The ground water investigation will clarify what is the origin of the of the product present in the residential well at Lorraine (for example, if it is due to infiltration from subsurface soil or maybe it has migrated to the regional aquifer along the filter pack of the residential well that may have acted as a conduit for the contamination).**

2. There are two lines connecting subsurface soil to sediment and surface water. I cannot see a connection between these two. – **Response: we cannot identify double lines connecting these media**

3. Should the construction worker have a complete pathway to GW? If construction encounters it, there could be the potential for ingestion, vapors, and direct contact? **Response: We have added the construction worker exposure to ground water in the eventuality that regional ground water will present within the upper 10 ft below the ground surface (the 0-10 ft depth interval is the only depth at which construction workers are expected to be digging for building foundations or basements). If regional ground water (not infiltrated water ponding on top of the sandstone/clay horizon) occurs within 10 ft of the surface, then construction workers may inhale vapors from contaminated water or can be exposed by direct contact; we do not consider ingestion to be a pathway of exposure for a construction worker. If the ground water daylights (discharges to the stream), then it is already covered under the surface water exposure medium.**

ECO

1. Where do fish fall with regards to the receptor list? **– Response: see above in the response to Barry Forsythe's email**

2. With the potential for VI, should the pathway for the soil invertebrate and the small burrowing mammal be complete pathways? **– Response: See above in the response to Barry Forsythe's email**

3. For plants, should the pathway to sediment be complete? **– Response: see above in the response to Barry Forsythe's email**

4. For Birds, should the pathway for aquatic food chain be complete? I have seen osprey and heron on the area, primarily around the two large ponds north and south of the site. **Response: exposure of birds was added to the CSM**

5. For mammals, should the pathway for aquatic food chain be complete? Animals such as raccoons or possum eating fish and crawfish (if present). **– Response: see above in the response to Barry Forsythe's email**

Katrina Higgins-Coltrain

Remedial Project Manager
US EPA Region 6
LA/OK/NM Section (6SF-RL)
1445 Ross Avenue
Dallas, Texas 75202
214-665-8143

Comments received From: Turner, Philip [mailto:Turner.Philip@epa.gov]
Sent: Thursday, February 18, 2016 5:08 PM
To: Forsythe, Barry; Coltrain, Katrina
Cc: McMillan, Teresa; Radu, Cristina; Todd Downham
Subject: Re: CSM--ECO and HH

My two cents...

For Eco:

I agree with Barry's comments.

Inhalation should be complete, but not quantifiable/insignificant – **Response: It is unclear from the comment for which exposure media and for which receptors a change has to be made**

Plants and sediment is a complete pathway, though probably insignificant – **Response: for sediment, we only have exposure through ingestion and direct/contact; does this comment indicate we should mark direct contact of plants to sediment as insignificant? Please clarify.**

The GW-SW pathway should be investigated, which would make eco pathways to GW "potentially" complete – **Response: the surface water to groundwater interaction is already marked on the HH CSM and will be investigated. When ground water daylights, it becomes surface water and surface water is already considered an exposure medium for the eco receptors. Please see general explanation on the approach for infiltrated water vs. ground water.**

The pathway for mammals and food chain is complete, but listed as insignificant. this is probably true since I doubt even many mammals are actually getting any food from the creek here. – **Response – comment noted.**

For HH:

I assume the lines from subsurface to soil to SW and sediment would be due to long-term erosion in some areas, like the drainages; **Response: the water ponding on top of the subsurface where refusal was encountered during drilling is not considered perched ground water; the arrows in the CSM indicate that there is a potential for contamination from subsurface soil to possibly migrate to surface water/sediment through seeps, the transient infiltrated water acting as a transport mechanism; this is one of the questions that the investigation will answer**

Agree that constructions workers can be exposed to groundwater via ingestion and contact. They can also be exposed via inhalation, though not "indoor**".** **Please see response to Barry Forsythe's comment**

The trespasser can also be exposed to GW if they encounter a seep. This pathway is potentially complete, though probably insignificant – **Response: agreed that a trespasser may be ingesting water from a seep; however, a seep sample will be evaluated as surface water.**

The trespasser could also ingest wild foods, but probably insignificant – **Response: Because the HH CSM was so busy, insignificantly complete pathways have been identified as incomplete in the diagram. The data collection designed will not include additional sampling to evaluate these insignificant HH exposures. Please let us know if you require these insignificant pathways to be added or we can add a note specifying that for clarity, they are not depicted on the diagram.**